UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/893,006	06/28/2001	Igor Chirashnya	CHIRASHNYA1	6396

1444	7590	01/24/2006

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EXAMINER
CHANKONG, DOHM

ART UNIT	PAPER NUMBER
2152	

DATE MAILED: 01/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	09/893,006	CHIRASHNYA ET AL.
	Examiner	Art Unit
	Dohm Chankong	2152

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☐ Responsive to communication(s) filed on _____ .
2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-93* is/are pending in the application.
    4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) *1-4, 10-12, 18-29, 32-35, 41-43, 49-66, 72-74 and 79-91* is/are rejected.
7) ☒ Claim(s) *5-9, 13-17, 30, 31, 36-40, 44-48, 61, 62, 67-71, 75-78, 92 and 93* is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a) ☐ All   b) ☐ Some * c) ☐ None of:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
    3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)
1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____ .

DETAILED ACTION

1>   Claims 1-93 are presented for examination.

2>   This is a non-final rejection.

Allowable Subject Matter

3>   Claims 5-9, 13-17, 30, 31, 36-40, 44-48, 61, 62, 67-71, 75-78, 92 and 93 are objected to as

being dependent upon a rejected base claim, but would be allowable if rewritten in

independent form including all of the limitations of the base claim and any intervening

claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art
> are such that the subject matter as a whole would have been obvious at the time the invention was made to a
> person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be
> negatived by the manner in which the invention was made.

4>   Claims 1-4, 10-12, 25, 29, 32-35, 41-43, 63-66, 72-74 are rejected under 35 U.S.C. 103(a) as

being unpatentable over Provan et al, U.S Patent No. 6.208.955 ["Provan"].

5>   As to claim 1, Provan discloses a method for diagnosis of a system made up of a

plurality of interlinked modules, comprising:

receiving an alarm from the system indicative of a fault in one of the modules [column 5 «lines 38-53»];

responsive to the alarm, constructing a causal network associating the fault with malfunctions in one or more of the modules that may have led to the fault and relating a conditional probability of the fault to respective probabilities of the malfunctions [column 4 «lines 4-11» | column 6 «lines 17-51» | column 7 «lines 39-46» | column 8 «lines 24-36» | column 15 «lines 42-52»]; and

proposing a diagnosis of the alarm responsive to the updated probabilities [column 7 «lines 39-51»].

Provan does disclose based on the alarm and the causal network, updating the query directed acyclic graph [column 15 «lines 19-34»] but does not expressly disclose updating the probabilities of the malfunctions. However, as disclosed by Provan, his network, the query directed acyclic graph is directed towards a Boolean expression that contains all possible diagnoses for the system. Each leaf node of the graph represents a probability of some event [column 8 «lines 23-36»]. Thus, by implication, updating of the graph updates the probabilities within the graph.

It would have been obvious to one of ordinary skill in the art to reasonably infer that updating of Provan's graph would necessary update the probabilities within the graph.

6> As to claims 2 and 3, Provan discloses gathering event reports from the plurality of the modules in the system, and extracting the alarm from the event reports [column 15 «lines 4-18»] and receiving a report of a change in configuration of the system, and wherein

constructing the causal network comprises constructing the causal network based on the changed configuration [column 15 «lines 4-34» where : Provan updates the network based on newly collected inputs, including fault reports. The fault reports correspond to a report in the change in a configuration (faulty sub-system)].

7>   As to claim 4, Provan discloses maintaining a databse in which the configuration is recorded, and updating the database responsive to the report of the change in configuration for use in constructing the causal network [column 14 «lines 17-40»].

8>   As to claim 10, Provan discloses multiple instances of a given one of the modules interlinked in a regular pattern [column 5 «lines 46-53»], and wherein constructing the causal network comprises defining a template comprising a group of nodes in the network corresponding to the given one of the modules, and instantiating the template with respect to one or more of the modules responsive to the alarm [column 8 «line 44» to column 9 «line 15» where : Provan's rules and rule sets correspond to a template].

9>   As to claim 11, Provan discloses identifying a local fault condition in the one of the modules in which the fault occurred, and responsive to the local fault condition, linking the fault in the causal network to one of the malfunctions occurring in the one of the modules [column 8 «line 44» to column 9 «line 15»].

10> As to claim 12, Provan discloses identifying a local fault condition in the one of the modules in which the fault occurred, and responsive to the local fault condition, linking the fault in the causal network to one of the malfunctions occurring in the one of the modules [column 13 «lines 13-26»].

11> As to claims 25, 29, 32-35, 41-43, 63-66, 72-74, as they do not teach or further define over the previously claimed rejections, they are similarly rejected for at least the same reasons set forth for claims 1-4 and 10-12.

12> Claims 18-24 26-28, 49-60 and 79-91 are rejected under 35 U.S.C § 103(a) as being unpatentable over Provan, in view of Heger et al, U.S Patent No. 6.415.276 ["Heger"].

13> As to claims 18 and 19, Provan does not expressly teach the probabilities of the malfunctions are defined in terms of a probability distribution having a mean and a moment, and wherein updating the at least one of the probabilities comprises reassessing the mean and the moment of the distribution.

14> Heger discloses the probabilities of the malfunctions are defined in terms of a probability distribution having a mean and a moment, and wherein updating the at least one of the probabilities comprises reassessing the mean and the moment of the distribution. [column 23 «lines 1-39»] and wherein the distribution comprises a failure rate distribution, and wherein reassessing the mean and the moment comprises updating the failure rate

distribution using a Bayesian Reliability Theory. Heger discloses the benefits of his

invention include providing a better method for diagnosing sensor and process faults

utilizing the Bayesian network [column 3 «lines 41-48» | column 4 «lines 45-47»]. Thus, one

of ordinary skill in the art would have been motivated to combine Heger's functionality with

Provan's belief network to provide a better method for diagnosing sensor and process faults.

15>   As to claims 20, 21 and 22, Provan does not expressly teach comparing one or more of

the updated probabilities to a predetermined threshold, and invoking diagnostic action when

the one of the probabilities exceeds the threshold.

16>   Heger discloses comparing one or more of the updated probabilities to a

predetermined threshold, and invoking diagnostic action when the one of the probabilities

exceeds the threshold [column 23 «lines 27-39»], notifying a user of the system of the

diagnosis [column 6 «lines 31-33» | column 23 «lines 27-39» where : a fault is declared to the

user], and providing an explanation of the diagnosis based on the causal network [column 6

«lines 31-33» where : the fault provides the explanation to the user].

Heger discloses the benefits of his invention include providing a better method for

diagnosing sensor and process faults utilizing the Bayesian network [column 4 «lines 45-

47»]. Thus, one of ordinary skill in the art would have been motivated to combine Heger's

functionality with Provan's belief network to provide a better method for diagnosing sensor

and process faults. One would have been particularly motivated to combine Provan and

Heger here as Heger would providing an improved, real-time method for updating

probabilities within the network.

17>   As to claims 23 and 24, Provan does not expressly disclose performing a diagnostic test

to verify the malfunctions, wherein the test is selected responsive to the one of the

probabilities exceeding the threshold, and modifying the causal network responsive to a

result of the diagnostic test.

18>   Heger discloses performing a diagnostic test to verify the malfunctions, wherein the

test is selected responsive to the one of the probabilities exceeding the threshold, and

modifying the causal network responsive to a result of the diagnostic test [column 3 «lines

41-54» where : updating the probability distribution in effect updates the Bayesian network].

Heger discloses the benefits of his invention include providing a better method for

diagnosing sensor and process faults utilizing the Bayesian network [column 4 «lines 45-

47»]. Thus, one of ordinary skill in the art would have been motivated to combine Heger's

functionality with Provan's belief network to provide a better method for diagnosing sensor

and process faults.

19>   As to claims 26-28, 49-60, 79-91, as they do not teach or further define over the

previously claimed limitations, they are similarly rejected for at least the same reasons set
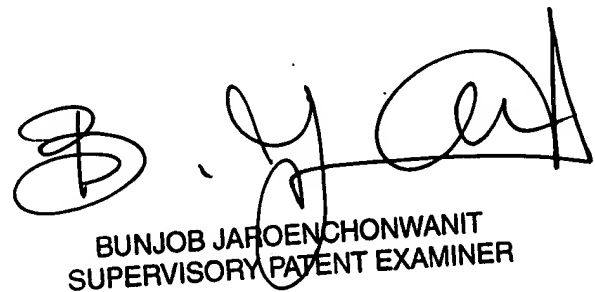
forth for claims 18-24.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dohm Chankong whose telephone number is 571.272.3942. The examiner can normally be reached on Monday-Thursday [7:00 AM to 5:00 PM].

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bunjob Jaroenchonwanit can be reached on 571.272.3913. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DC

BUNJOB JAROENCHONWANIT
SUPERVISORY PATENT EXAMINER